MICROSCOPY.[1]

STRUCTURE OF THE HUMAN SKIN.—The following note refers to a method of isolating the epidermis of human and other embryos from the underlying dermis, and to the presence of a layer of cells, not previously described, which may be observed in the epidermis when so prepared, and which corresponds, I think, to the epitrichium of birds. The method is also convenient for the study of the development of hairs.

It is well known to physicians that if the fœtus dies and is retained, it is preserved for a considerable period without disintegration of the tissues in the amniotic fluid. In specimens thus preserved it is often found that the epidermis is loosened so much that strips can be removed without tearing off the underlying tissues. Now as the amniotic fluid is little more than a salt solution, the facts just stated naturally suggest that a salt solution preserved from septic changes is sufficient to loosen the epidermis of the embryo. My experiments have satisfied me that a sojourn of several days in a 0.6 per cent solution of common salt, with 0.1 per cent thymol added to prevent putrefaction, is a simple and satisfactory way of liberating the embryonic epidermis from its connections, so that bits can be easily removed for histological examination, for which they are apparently still adapted; even the minute structure of the nucleus will persist through this treatment, though imperfectly.

A piece of epidermis of a human embryo, of about six months, taken from the scalp by this method and stained with hæmatoxyline, is shown in the accompanying figure;[2] each dot represents a nucleus. We distinguish two kinds of nuclei, those which are darker stained and those which are lighter. Some of the nuclei in the figure appear darker from another cause to be stated directly, but with the exception of these, all the dark nuclei belong to cells which participate in the formation of the hairs. At first the dark nuclei make a little cluster, as at *1* and *2*; the clusters grow in size; one a litttle larger is seen just to the left of that numbered *2*, one a good deal larger is shown at *3*. Sections show that such clusters are on the under side of the epidermis and form slight protuberances or rudimentary papillæ; the papillæ lengthen out and acquire rounded ends, *4*; they grow rapidly down into the cutis, and by the contraction of their upper part become club-shaped, *5* and *6*. The next step is the formation of the dermal papillæ of the hair, *7*; a little notch arises at the thick end of the epidermal ingrowth, and the tissue filling this notch is the so-called dermal papilla. The figure presents also a well-developed hair; here the axial portion of the papilla has formed the hair, *h*, while the cortical portion has formed the follicle, *f*; the end of the

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[2] The illustrations are borrowed from a forthcoming work on human embryology.

hair is thickened, *h'*, as the so-called hair bulb; the sebaceous gland, *Gl*, has begun to grow out from the follicular walls. In the upper part of the follicle the hair lies quite free, hence in several places where the hairs have been forcibly torn off the upper part of the follicle, *F*, still remains, while the lower part attached

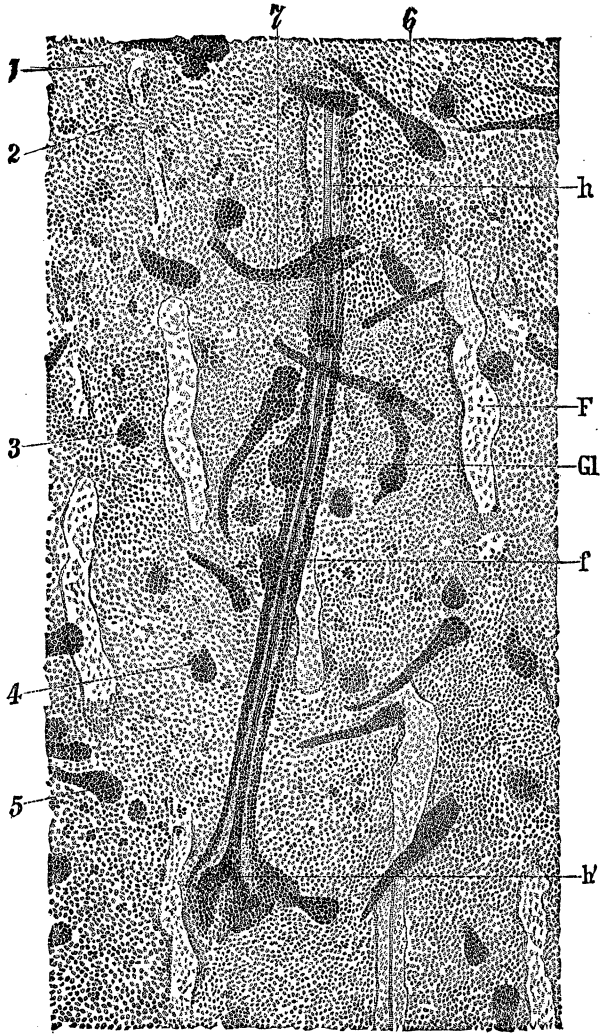

FIG. 1.—Embryo human epidermis.

to the hair is gone. In the walls of the follicle I notice granules which I take to be of eleidine (cf. Ranvier's Traité technique, p. 890).

The above description contains nothing new, and is intended

to serve merely as an explanation of the preparation regarded as an object to demonstrate the development of hairs. The preparation also reveals the existence of an important undescribed layer in the skin, namely, the epitrichium.

With a low power one observes in the preparation we have been considering, and in others similar to it, that there are scattered about everywhere little groups of nuclei, three to five, as *1* in Fig. 1, which appear darker than the rest; only a very few of these are represented in the drawing; examination with a higher power shows that this effect is produced by large stained bodies lying on the outer surface of the skin.

The characters of the bodies in question are indicated by the accompanying figure. They are irregular in size and shape; quite granular; in preparations stained in picric-acid carmine each body is readily seen to lie in a separate area with very distinct polygonal outlines, but the area is only partly filled by the body; occasionally there is a distinct round body of smaller size and more darkly stained than the main body we are now describing. I consider the outlines to be cellular, the granular bodies to be the shrunken mass of protoplasm of the cells, and the inner round body to be the nucleus. In fact, the supposed nuclei appear very clearly in almost every one of the cells after a specimen has been stained by alum hæmatoxyline. The cells are very much larger than those of the horny layer proper, two layers of which are drawn in, in the figure, to scale for comparison. The layer of cells is continuous over the whole surface, even over the hair follicles and the hairs, and is absolutely distinct from the horny layer. It can hardly be questioned that it is homologous with the so-called epitrichium of birds and reptiles. For a full account of the epitrichium of those animals, I refer to the valuable memoir by E. G. Gardiner in the Archiv. für mikroskopische Anatomie, Vol. XXIV, p. 289. Welcker long ago (1864) showed that an epitrichium, or a special layer outside of the horny layer, exists in various mammals, but Köl-liker has expressly denied the occurrence of a true epitrichium in man, and after saying in his larger Entwickelungsgeschichte (2d ed., p. 776) that the outer parts of the horny layer may be thrown off, adds, "it has not been demonstrated, that over all and

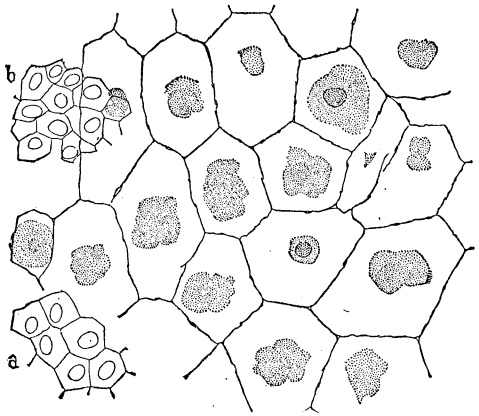

FIG. 2.—Human epitrichium.

in the first instance only the external layer is sloughed off, and that between this and the next following horny layers there is a definite contrast." As we have seen, the distinguished Würzburg embryologist has expressed doubts not justified by the facts, there being an external layer which is extremely different from the horny layer, and is apparently a true epitrichium.

The human epitrichium, so far as I have observed, is developed quite late, about the fourth or fifth month, though to be sure an enlargement of the outermost epidermal cells may be observed earlier than this.

I deem it probable that the presence of the epitrichium as an intact membrane results in the retention of the secretions of the fœtal sebaceous glands, and is therefore the immediate cause of that hitherto unexplained phenomenon, the formation of the so-called *vernix caseosa* of physicians.

It is not rare in science that something, easily seen, remains long overlooked, and each time we are touched by surprise when observation is thus corrected. Certainly the human skin is not a structure which the microscopist would have searched in order to discover a new layer of cells, which are easily demonstrated and very conspicuous. I may confess that I looked at the preparations, which show the epitrichium plainly, a great many times without observing at all what I now see at the first glance.—*Charles Sedgwick Minot.*

KARYOKINESIS.—In the study of karyokinesis in the arthropods, Professor J. B. Carnoy[1] obtained the best results with the two following mixtures:

(1)[2] Chromic acid (2 p. c. or more).....45 parts.
Osmic acid (2 p. c.).....16 "
Glacial acetic acid.....3 "
(2) Corrosive sublimate
Glacial acetic acid (1 p. c.).

The object (testes) is left from six to ten minutes in one of these mixtures; then washed in distilled waters and further hardened in alcohol.

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SCIENTIFIC NEWS.

—Edward Tuckerman, professor of botany in Amherst College, died March 15, aged sixty-nine years. He was a graduate of Union College (1837), of Harvard College (1846), of the Harvard Law School (1839); studied history, philosophy and botany several years in Germany, and in 1858 was appointed to the chair of botany at Amherst College, which he held to the day of

[1] La Cytodiérèse chez les Arthropodes, p. 211. (Extrait de la Revue "La Cellule," I, 2o fas., Louvain, 1885.)
[2] Modified form of Flemming's mixture.